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ABSTRACT

This volume is the fourth in a series of 29 coordinated MINNEMAST units in mathematics and science for kindergarten and the primary grades. Intended for use by kindergarten teachers, this unit guide provides a summary and overview of the unit, a list of materials needed, and descriptions of seven groups of activities. The purposes and procedures for each activity are discussed. Examples of questions and discussion topics are given, and in several cases ditto masters, stories for reading aloud, and other instructional materials are included in the book. This unit deals with the five senses. After an introductory pair of lessons on exploring sense impressions, groups of lessons for sight, hearing, smell, taste, and touch are discussed. A final section of lessons is titled "Fun With Our Senses." Bibliographies for both students and teacher are included in this volume. (SD)

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USING OUR SENSES

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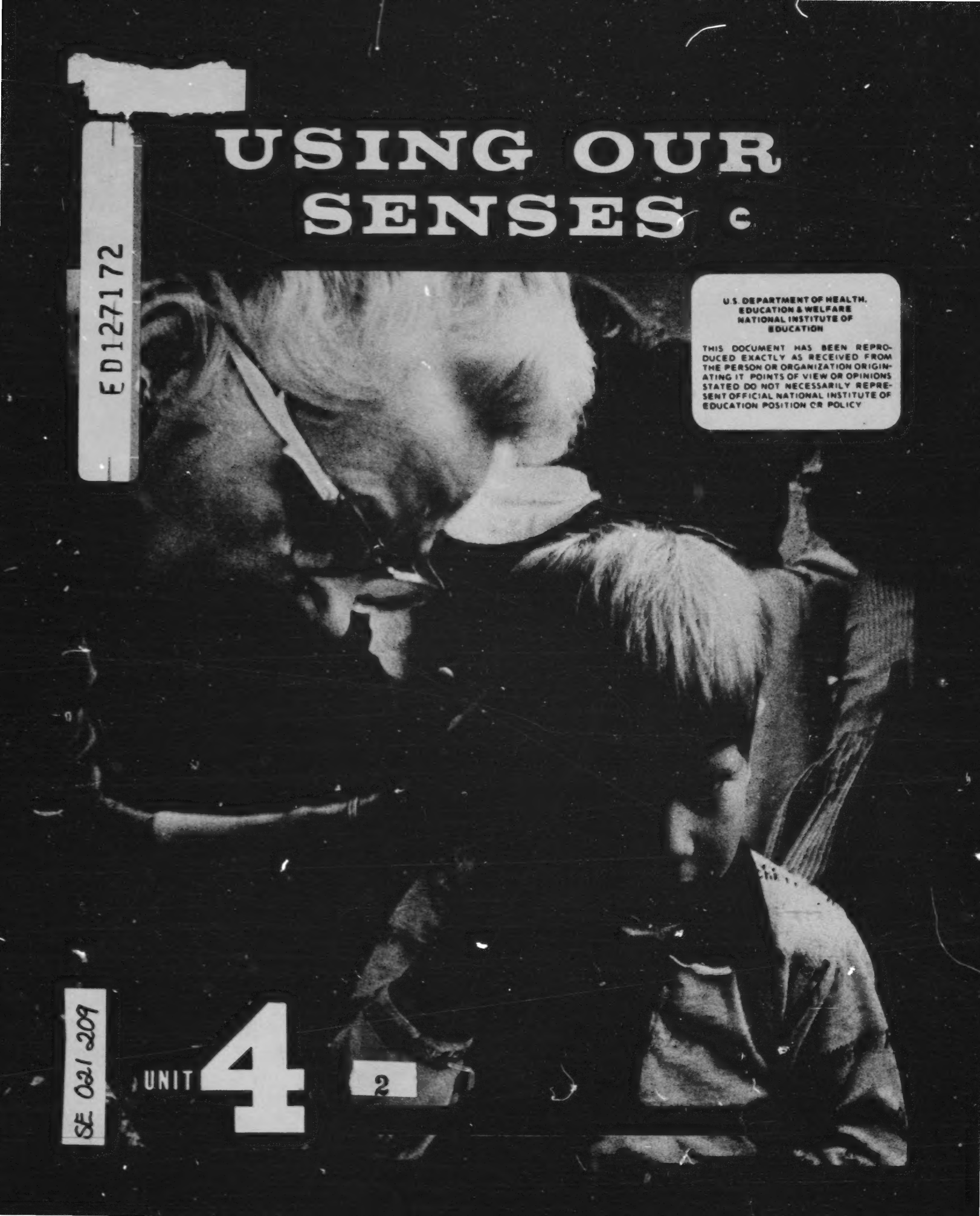

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UNIT 4

2

MINNEMAST COORDINATED MATHEMATICS–SCIENCE SERIES

KINDERGARTEN

1. WATCHING AND WONDERING
2. CURVES AND SHAPES
3. DESCRIBING AND CLASSIFYING
4. USING OUR SENSES

FIRST GRADE

5. INTRODUCING MEASUREMENT
6. NUMERATION
7. INTRODUCING SYMMETRY
8. OBSERVING PROPERTIES
9. NUMBERS AND COUNTING
10. DESCRIBING LOCATIONS
11. INTRODUCING ADDITION AND SUBTRACTION
12. MEASUREMENT WITH REFERENCE UNITS
13. INTERPRETATIONS OF ADDITION AND SUBTRACTION
14. EXPLORING SYMMETRICAL PATTERNS

SECOND GRADE

15. INVESTIGATING SYSTEMS
16. NUMBERS AND MEASURING
17. INTRODUCING MULTIPLICATION AND DIVISION
18. SCALING AND REPRESENTATION
19. COMPARING CHANGES
20. USING LARGER NUMBERS
21. ANGLES AND SPACE
22. PARTS AND PIECES

THIRD GRADE

23. CONDITIONS AFFECTING LIFE
24. CHANGE AND CALCULATIONS
25. MULTIPLICATION AND MOTION
26. WHAT ARE THINGS MADE OF?
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USING OUR SENSES

MINNEMAST COORDINATED MATHEMATICS-SCIENCE SERIES

UNIT 4

4

MINNESOTA MATHEMATICS AND SCIENCE TEACHING PROJECT

The Minnesota Mathematics and Science Teaching Project

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MINNESOTA MATHEMATICS AND SCIENCE TEACHING PROJECT

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Complete List of Materials for Unit 4

(Numbers based on class size of 30.)

total number required to teach unit	item	lessons in which item is used
2-3 each	several of each of three kinds of fruit that have very different properties, e.g., apples, bananas, tangerines, lemons, oranges, pineapples, nuts in the shell, whole coconut	1,2
1 each	2 different kinds of flowers	1,2
1	set of objects of similar shape but different colors	4
1	piece of cardboard, 2" x 2"	6
1	** white cut-out of rabbit	7
1	* blue and yellow cellophane rolls	7
1 each	rhythm instruments, e.g., bells, tambourine, cymbals, finger cymbals, triangle, drum, bongo drum, tom-tom, xylophone, sandpaper blocks, mallet	10
1	can with marbles or stones inside	10
1	cloth or paper to tear	10
1	* cellophane to crumple	10
1	record of nature sounds (consult record catalogue or library -- not available from MINNEMAST)	10
30	* thick rubber bands	11
1	scissors	11
1	autoharp or other stringed instrument	12
3-4	matching glass tumblers	13
1 each	1 each of 6 of the following: onion, orange, apple, ripe banana, fresh pine needles, chocolate, fragrant flower, cotton wad moistened with perfume or liquid bleach or ammonia, moth flakes or balls, damp soil, sage or other herbs, sachet, cloves or other spices	14,15
6	* plastic lattice berry boxes	15
1	1 yard cheese cloth	15

6	pictures of fruits and vegetables	15
1	* roll of plastic wrap	16
30 each	individual servings of food which have the four basic tastes, e.g., honey or sugar cubes; salt; lemon, grapefruit rind or sour pickle; bitter chocolate, instant coffee or instant tea	18
30	paper plates or napkins	18
1	box of unsweetened cocoa	19
1	bag of sugar	19
30 each	individual servings of foods which have some combination of two or more of the four basic tastes, e.g., fruits, vegetables, ginger snaps, celery and salt, peanut butter, chocolate bits, sweet pickle, hard candy	19,21
50	* toothpicks	19,21
1 each	several objects of distinctive texture and shape, e.g., pineapple, velvet, cucumber, a smooth plastic object	22
6	** cardboard with die-cut geometric shapes	23
30	* sets of "touch" objects, containing cotton puff (ball), 16-penny spike (nail), large button, ribbon, sandpaper, plastic tubing, and a short length of wire, each in an opaque bag	25
2	* rubber ball and plastic ball of similar size	27
2	fresh fruit and plastic fruit of same kind	27
2	sugar cube and cubical box of similar size	27
2	carrot and parsnip of similar size	27
1	hard boiled egg	28
4	* sets of sense and object blocks	29
	bag of unpopped corn, corn popper, salt and 30 paper cups	31

* kit items as well as

** printed materials available from Minnemath Center, 720 Washington Avenue S.E., Minneapolis, Minn. 55455

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INTRODUCTION

PURPOSE

- To develop the child's awareness of how seeing, hearing, touching, smelling and tasting contribute to his conception of his environment.

- To provide practice for the child in gathering information by his five senses.

- To help the child refer to his sense impressions in describing both familiar and unfamiliar objects.

COMMENTARY

A child discovers the external world through the use of his basic senses of sight, smell, hearing, touch and taste. He also reacts to the world in terms of his past experiences.

In the first kindergarten unit, Watching and Wondering, the child is encouraged to become a careful observer. His observations are based on a mixture of his sense impressions of the many objects surrounding him. In this unit, he goes on to discover the part each of his senses plays in making these observations.

The observer is not entirely outside and apart from what he is observing. We need to be aware of the limitations of sense data by taking into account the circumstances which affect perception. If, for example, an observer explores an ice cube by touching it, he is acting on it (melting it) at the same time that he registers the fact that it feels cold. Similarly, while he can see an object only by the light reflected from it, he is also to a degree reflecting light back to the object. For example, if a girl wearing a red dress holds a piece of white paper in her hand, it might look pink to her, while another child in different clothing might see it as pale yellow or pale green. Considerations of this type may of course be beyond the child's comprehension. But he can at least begin to be conscious of his role as observer. He can begin to learn the value of checking his sense impressions against those of others.

An important feature of this unit on the senses is the attempt to develop precision and objectivity in the child's observations and descriptions. At first these will be vague. With your guidance, he will begin to learn to distinguish between a statement that tells how he feels about an object and one that actually describes the object in ways that can be checked by other observers. For example, he might say about a rabbit, "It's nice." This kind of statement doesn't give any information about the rabbit. If he says instead, "When I touch it, it feels warm and soft; when I look at it I see it is white and has pink eyes," he is giving a description of characteristics of the rabbit as relayed by each of two senses.

Since you do not wish to discourage any offering of the child, the best way to lead him to an objective statement is to have him identify the sense impressions on which his comments are based. For example, if a child says "I like that flower," ask him "What do you like about it? The smell? The color?" You might have the children consider what it is about a particular food that makes it pleasant to one child and unpleasant to another. Is it color, shape, texture, taste or smell?

The five senses that the child is called upon to use in these lessons are sight, hearing, touch, taste, and smell. Each relates to an organ equipped with specialized nerve endings which receive appropriate stimuli. For example the eyes receive stimuli from light sources and taste buds receive chemical stimuli.

In Section I the activities should help the child to differentiate the kinds of information provided by each of his five senses. He will be helped to discover that individuals often differ in their reactions to the same sense impressions.

In Sections 2 through 6 the child explores each of the senses separately, learning what kind of sense data comes through each sense organ, and identifying the circumstances necessary for the operation of each. Seeing, for example, requires light unobstructed by visual barriers; hearing requires vibration of a sound-producing object. If one is to smell, there must be odor in the air. Touching and tasting, unlike the other modes of sensing, require direct contact.

After having analyzed the separate senses, in Section 7 the child uses all his senses in gathering information about objects presented to him. By the end of the unit, it is hoped that the child will be able to describe objects with greater precision than he was capable of earlier in the year.

NOTES ON THE USE OF THIS UNIT

On pages 4 and 5 you will find pictures of the individual sense organs, together with suggestions for using the pictures. These should be used whenever appropriate throughout this unit, and even after you have completed the formal lessons on the five senses.

Please note that the questions printed in capital letters are intended as a guide for discussion rather than as a script you must follow. Similarly, the answers are intended to indicate the goals of the discussion.

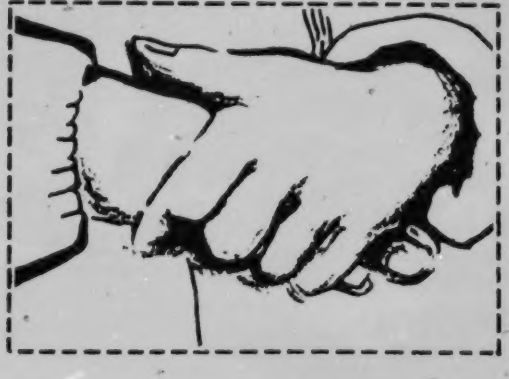
You may find in working with this unit that it is sometimes a problem to gather the materials necessary for a particular lesson. We cannot urge you strongly enough to make the effort. It does no good to talk about sensory impressions without giving the children the actual experiences.

The sequence in which the senses are presented here has no special significance. If a classroom experience stimulates an interest in a particular sense out of sequence, feel free to follow this lead. Try to extend the work of this unit to the environment beyond the classroom. The postscript after Lesson 31 is not intended as an afterthought. It is an integral part of the unit and you will find it helpful to read it now.

"Jeff's Dream" is a story that runs through this entire unit. In it Jeff's five senses go off on independent adventures and come to recognize their interdependence. The appropriate installment is presented in the manual at the end of each section and should be read when that section is finished.

There are 31 lessons in this unit. One or two lessons may take two days to complete; others are very brief and two should be done in one day. You should plan to spend about one month on this unit.

copy of sense organ pictures



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USING THE SENSE ORGAN PICTURES

Cut out each sense organ picture and mount it. Have the children bring in pictures that have special associations with one or the other of our senses. (In some areas children do not have access to many sources of pictures. In such a case it may be necessary for you to provide the magazines or newspapers.)

In the course of these activities, the children may get into legitimate disagreements over which organ a picture should be matched with. This illustrates the fact that most of the time we use a combination of senses in our everyday perceptions.

Bulletin Board

Have the children select pictures most appropriate to a particular sense organ and group them around the proper sense organ picture on the bulletin board.

Scrap Book

Head each section with a sense organ picture. Have the children paste magazine pictures in the appropriate sections.

Game

Distribute to several children the pictures illustrating objects with properties that stimulate one or more of the five senses. Give the sense organ pictures to another child, who is to be the leader. When the leader holds up a sense organ picture, the others are to find appropriate pictures from their piles and hold them up.

SECTION I OUR FIVE SENSES

PURPOSE

- To enable the child to differentiate the kinds of information provided by each of his five senses.

- To introduce to the child the idea that he often makes value judgments about sense impressions, and that these may legitimately differ from the value judgments of others.

COMMENTARY

What kind of formal introduction to the senses does a five-year-old need? He has used his senses since he was born, but usually not with any special awareness. In order to increase his powers of observation, it will be helpful if he can become aware of what sort of information he can gather through each of his senses. When he isolates the contributions of each sense, he also will become aware of the limitations of a single sense. He should then realize that the information conveyed by several senses will be more complete than the information he can get by using one sense alone. For example, the many properties of an apple are revealed only when sight, smell, touch, taste and hearing are all in operation.

A child will often describe an object by the way he feels about it. Each of us makes value judgments, and we do not always agree with each other. In this section, the children should begin to learn that it is easier to find agreement when they describe things objectively.

MATERIALS

- several of each of 3 kinds of fruit that have very different properties, e.g., apples, bananas, tangerines, lemons, oranges, pineapples, and nuts in the shell (1, 2)

- a whole coconut, if possible (1, 2)

- 2 different kinds of flowers (1, 2)

Lesson I: EXPLORING SENSE IMPRESSIONS

Select two or three of the fruits and flowers from the materials list. (The coconut is especially useful because of its unusual shape, texture, and the sounds it produces when shaken or tapped.) Have the children seated so that objects can be passed easily from one to the next. Pass an object. When it has gone around, ask a child:

> TELL ME SOMETHING ABOUT THIS. If the answer is general (for example, "It's a flower"), ask to be told something more. If a specific property is mentioned (for example, "It's red") ask:
>
> HOW DO YOU KNOW?
>
> WHAT PART OF YOUR BODY WERE YOU USING WHEN YOU NOTICED THE COLOR? (eyes)
>
> WE CALL THIS USING THE SENSE OF SIGHT.

Continue this discussion naming each sense and linking each with the appropriate sense organ.

Since the children are unlikely to use the sense of hearing, tap the objects and ask if they now can tell anything additional about them. The sense of taste can be introduced last by giving each child a sample of fruit to taste.

Lesson 2: DO WE ALL AGREE?

Using materials from Lesson 1, ask a child to select the fruit or flower he likes the best. Have him give a reason for his choice. Ask another child for his favorite item and the reason for his choice. Continue this procedure as long as the interest lasts. These will be value judgments. Try to elicit opposing ones. This activity should call attention to the fact that individuals differ in their reactions to the same sense impressions.

ARE THERE SOME THINGS YOU MIGHT AGREE ON IN DESCRIBING THIS OBJECT? WHAT ARE THEY? (Color, shape, etc.)

STORY: JEFF'S DREAM

Jeffery Thomas Hendrickson had had a busy morning at kindergarten. He was telling his mother about it while they ate lunch.

"Mom," he said, "do you know that we have five senses and that we use those senses all the time? "

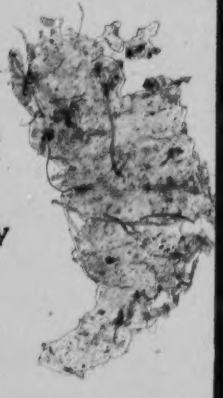
"That's very interesting, Jeff. What are the five senses? "

"Well, " Jeff said slowly, "I don't know if I can remember them all. Let's see — oh yes, that's one. Sight. Then there is hearing, and right now I'm tasting this good cookie. That's another one —taste. And I had to touch the cookie before I could put it in my mouth. It felt kind of bumpy. I guess it was the nuts that made it bumpy. That's four. I can't remember what the last one is. Do you know what it is? "

"I think the last one is something you do with your nose. "

"I smell with my nose. That's it," and Jeff clapped his hands.

After lunch Jeff reminded his mother that she had said she would go to the park with him.



Mother said, "I'm sorry, but I can't go. I was going to tell you about it at lunch but we had such an interesting conversation about our senses that I forgot. Mrs. Thompson has to see me about the program at school next week. This afternoon is the only time she could come over. " Jeff looked very disappointed. The park was such a nice place to play in, and there were always interesting things to see.

Then he heard Mother saying something that made him very happy.

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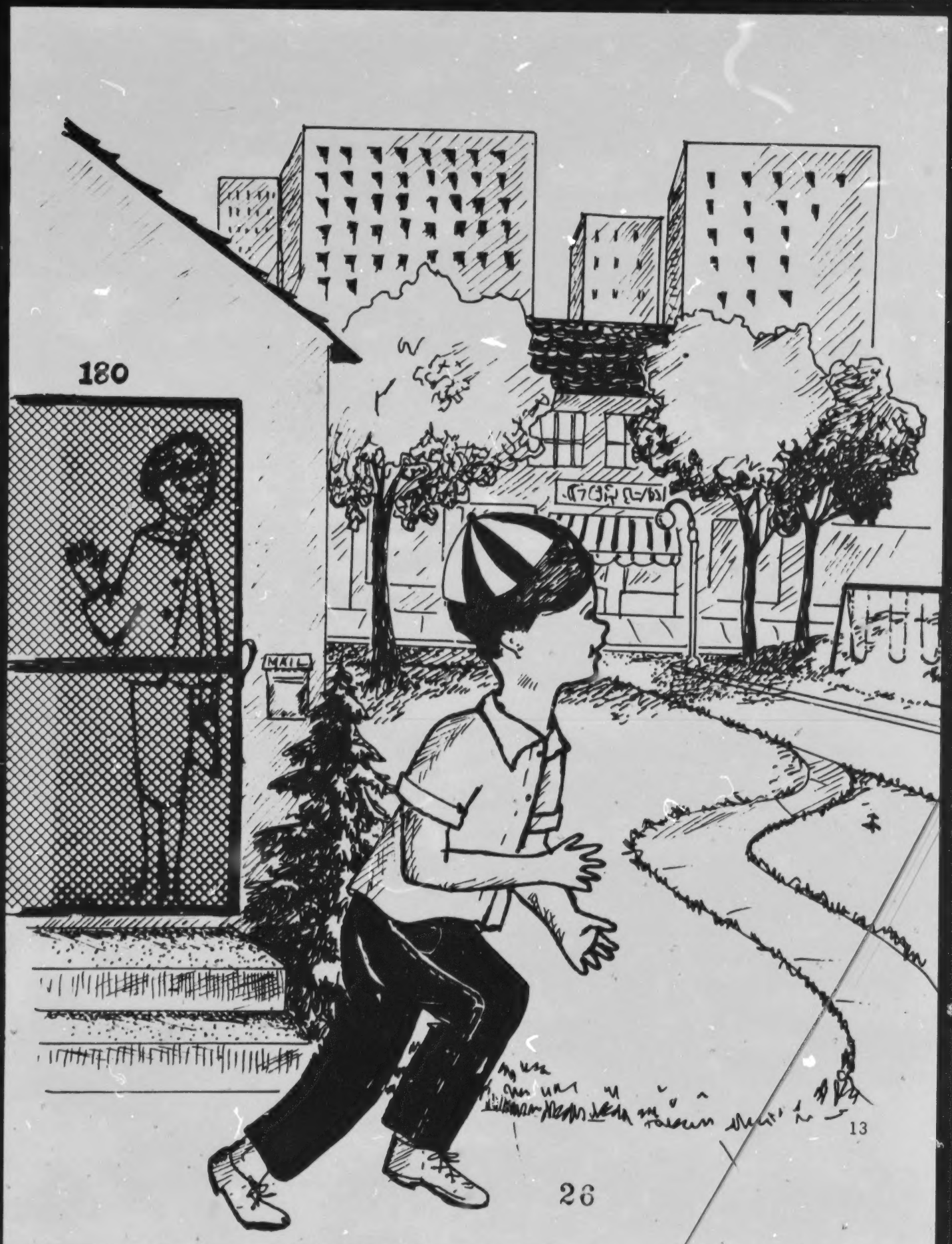
She said, "Why don't you go to the park alone? I know that you have not done this before, but I believe that you are now big enough to go by yourself. You know how to cross streets safely, and I know that I can depend on you to stay right in the area of the sandbox and the apple tree. Some of your friends will probably be there. I will come to meet you as soon as Mrs. Thompson leaves, and then we can walk over to the zoo together."

"Yippee! Sure, I can go to the park alone. I'll be very careful when I cross the streets. I will use my ears and my eyes and maybe I can even use my nose to tell me when it is safe to cross."

So Jeff went to the park alone. He was very careful when he crossed the streets. He looked both ways, he listened, and he even sniffed several times to find out if a car was coming. (He noticed that he could see the car coming, but he could not smell it until after it had passed.)

He was very excited about being alone, and that must have made him walk more quickly. None of his friends had come to the park yet. Jeff played in the sandbox and climbed on the bars. But it wasn't so much fun doing things when he was alone. He began to feel tired and a little sleepy. So he lay down on the grass in the shade of a big apple tree. He looked up and watched the apple leaves and the bright red apples swaying in the wind. The leaves were doing a slow, whispering dance. As he watched them, his eyes got heavier and heavier. Then what do you suppose happened? Jeff went to sleep, and he had a very interesting dream.

Jeff heard voices in his dream. He listened and was surprised to hear his senses talking.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MAIL

"Hey," whispered Smell, "I have an idea. If Jeff can go to the park alone, how about us going places by ourselves? I'd like to sniff many things that the rest of you are not interested in. We could come back in an hour and tell what we have done. How about it? "

"Good idea! " shouted Touch.

"Sh-sh," said Hear. "Not so loud, you'll wake Jeff, and then he'll want to come with us."

"I have always wanted to explore rocks and flowers and the fur on a bunny," Touch said softly.

"Yum yum, I can think of lots of foods I could taste while the rest of you were doing other things," said Taste.

So each of Jeff's senses agreed to go exploring by himself. They would come back in an hour to report on what they had done. Each one was as excited about going off by himself without Jeff as Jeff had been about going to the park without his mother.

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SECTION 2 SENSE OF SIGHT

PURPOSE

— To explore color and shape, two properties that can be observed using the sense of sight.

— To establish the need for an unobstructed line of vision between the object and the observer.

COMMENTARY

Children are surrounded by a great variety of objects. An important way of gathering information about these objects is through their sense of sight. In this section, the children should begin to realize the role sight plays in the information-gathering process.

The children are led to recognize two visual aspects of objects—color and shape. A circular shape may suggest to them several kinds of fruit, or such things as a ball, a pie, the sun or the moon. When color is specified in addition to shape, there is a smaller number of objects to which the description might apply. In general, the greater the number of clues given, the fewer the objects that will fit the description.

Outside influences may affect observations. If there is a visual obstruction, the child cannot see an object. If he looks through a sheet of colored cellophane, the object may appear to be a different color. In each case the object has remained the same, but external influences have changed the stimulus the child receives. In other words, in addition to being observant, the child should begin to be aware of the need to consider the conditions under which his observations are made.

MATERIALS

— a set of similarly shaped objects of different colors -- e.g., ball, fruit, round blocks (4, 6)

— cardboard, 2' x 2' (6)

— yellow and blue colored cellophane (one roll of each) (7)

— white cut-out of bunny (7)

Lesson 3: ISOLATING THE SENSE OF SIGHT

Have the children close their eyes and put their heads in their laps. Secretly choose one child to stand in front of the class.

WHO IS STANDING IN FRONT OF THE CLASS?

WHY CAN'T YOU TELL ME?

USE THE SENSE THAT WILL TELL YOU. (They open their eyes.)

WOULD HEARING HAVE HELPED? WOULD TOUCH HAVE HELPED?

As a variation, you might have a child hold something up while the class tries to tell what it is without looking.

Now, while the children keep their eyes open, have another child stand in front of the class.

WHO IS STANDING IN FRONT OF THE CLASS NOW?

IS IT EASIER TO TELL WHO IS IN FRONT OF THE CLASS NOW? WHY?

Lesson 4: SHAPE AND COLOR

Draw a circle on the chalkboard. Ask the children to name objects having this general shape (e.g., a clock, a ball, a pie, the sun, an apple). Then display several objects of similar shapes but different colors. This set might include an apple, an orange, a tomato, a ball, or four or five circular blocks of different colors.

WHICH OF THE OBJECTS DO YOU THINK OF WHEN YOU LOOK AT THE CIRCLE ON THE CHALKBOARD?

WHAT MORE DO YOU NEED TO KNOW TO TELL WHICH OF THESE I DREW A PICTURE OF?

Fill in the circle with red chalk.

NOW WHAT OBJECT DOES THIS RED SHAPE REMIND YOU OF?

Draw additional clues, such as a stem for the apple, until the choice is narrowed down to one object. You may want to repeat this procedure for other objects and other shapes.

Lesson 5: GAME: WHAT DO I SEE ?

Play a game involving identifying objects in the room by visual clues. There are many variations for such a game. One of them may proceed as follows:

I AM THINKING OF AN OBJECT IN THE ROOM. LOOK AROUND CAREFULLY AS I TELL YOU SOME THINGS ABOUT IT. WHEN YOU THINK YOU KNOW WHAT IT IS, RAISE YOUR HAND.

THIS OBJECT IS BIG.

IT IS RED.

IT IS SQUARE...

Continue giving visual clues until a child identifies the object. The children may enjoy taking turns thinking of objects and giving clues to the others.

Lesson 6: HIDDEN OBJECTS

Select a number of interesting objects and display them. Have a volunteer close his eyes. Choose an object, and ask the child which one you are holding up. If his guess is wrong, ask the children why he did not know. Continue with other volunteers until the children express the idea that they will not be able to see the object if their eyes are closed.

Now give a volunteer a sheet of cardboard, about 2' x 2', to hold in front of his face. Tell him to keep his eyes open. Select an object and hold it up as before. Ask the child to identify the object. Try this with several children. When they observe that the cardboard in front of their eyes blocks their vision as their eyelids did, do the same experiment holding the cardboard away from their faces and directly in front of the object.

WHY CAN'T YOU SEE THE OBJECT? (In every case, something was between the eyes and the object.)

IS THERE ANYTHING YOU CAN PUT BETWEEN YOUR EYES AND THE OBJECT THAT WOULD LET YOU STILL SEE IT? (eyeglasses, windowpane, clear plastic, etc.)

Lesson 7: CHANGING COLOR PERCEPTION

From the following activity, the child should become aware that his observations may be influenced by factors other than the properties of the object.

Show the children the large white cut-out of the rabbit, which is provided on a separate sheet.

WHAT IS THIS?

WHAT COLOR IS IT?

Place a piece of colored cellophane over it (e.g., blue).

NOW WHAT DO YOU SEE?

WHAT COLOR IS IT?

HAS THE RABBIT CHANGED?

IS THE RABBIT REALLY BLUE OR DOES IT JUST LOOK BLUE?

Show it to them with and without the cellophane several times to be sure that they understand that the rabbit has not changed but its appearance has changed. Repeat with cellophane of another color.

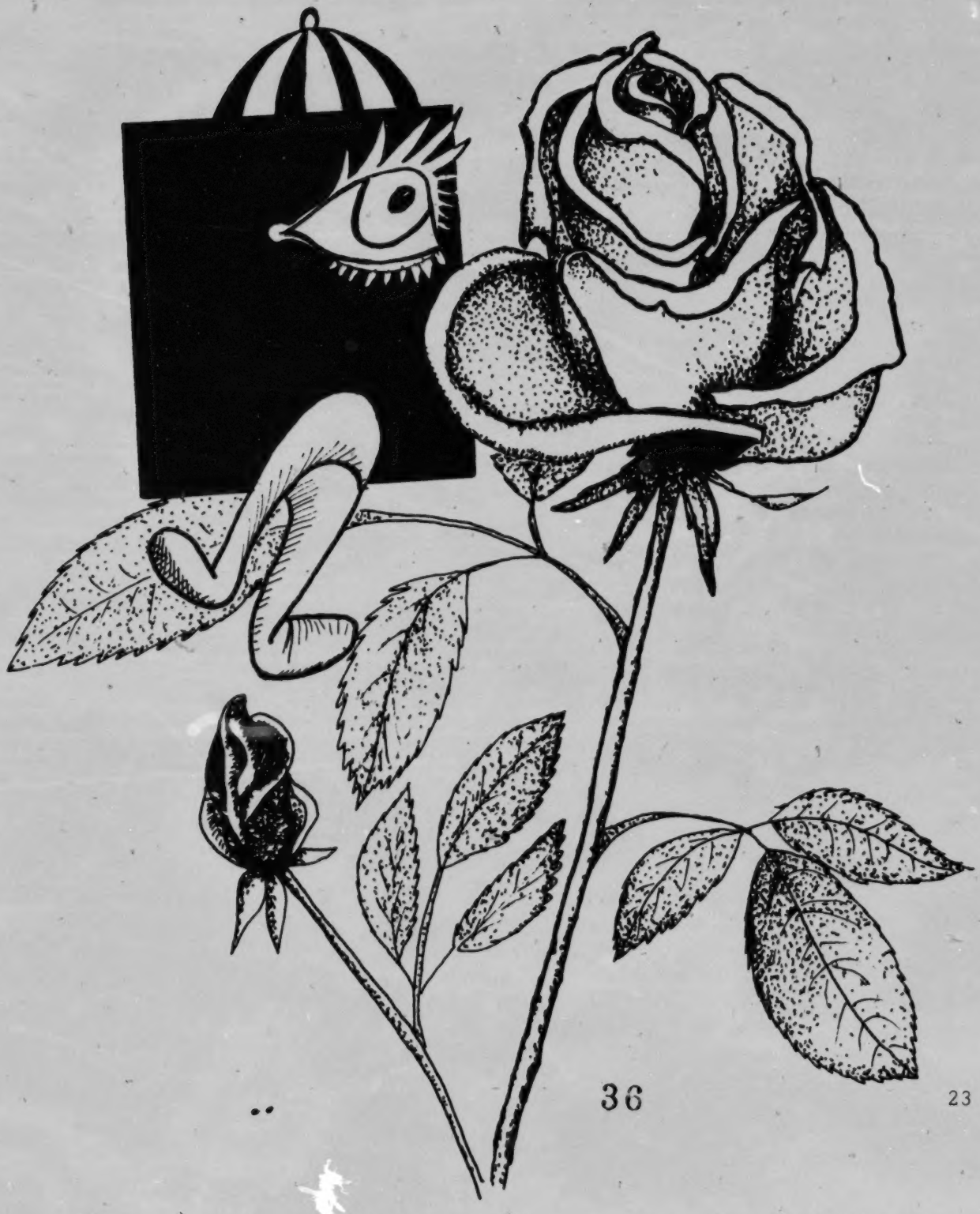
WHAT MADE THE RABBIT LOOK AS IF IT WERE NOT WHITE? (The cellophane is colored but we can see through it. We see the color of the cellophane and the shape of the rabbit.)

Give the children pieces of cellophane with which to experiment.

LOOK'S ADVENTURE

Look was the first to start off on his adventure. It felt strange to be all by himself. It was very exciting. What adventures would he have? He looked around. The sky was so blue and the clouds were so white! The clouds looked as though they were soft, but when Look got close to them he could not tell if they were. He was disappointed. If Touch were along, he would be able to tell!

As he was floating around, he saw a lovely garden. "I see some beautiful red roses. Oh, there are some yellow ones too. I like roses. It's too bad Smell isn't here. Roses smell so sweet!"



Then Look reminded himself that he was having his very own adventure. He looked around him. Suddenly he saw a crowd of people. He was curious. What were they doing?

As he came closer, he saw that the people were all shapes and sizes. Some were tall and thin, others were short and fat. He saw one woman wearing a yellow flowered dress and carrying a green umbrella. He noticed a little boy with red and white striped pants and a blue shirt.

Look came still closer to the crowd of people. He noticed that they were all watching something. He saw that their faces were smiling and that some of the children's hands were waving. Look peeked over the people's heads to see what was going on. It was a parade! Look loved parades.

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The first thing he saw was a big brass band. The men in the band were dressed in red and black uniforms. On each uniform were rows of bright, shiny brass buttons sparkling in the sunlight. Every person marching along had some kind of musical instrument. There were fat bright brass horns and long skinny silver flutes glistening in the sun. A whole row of men had drums of different sizes. Some others had metal discs which Look knew were cymbals.

But this was the quietest band Look had ever seen! Look noticed that the trumpet players' cheeks were puffed out, and their chests were heaving as they blew into their horns. He saw the drummers had sticks in their hands, which they moved rapidly to strike the drums. The fingers of the saxophone player were moving busily, and he was taking deep breaths and blowing very hard. The cymbal players moved their arms up and down in great sweeps, bringing the cymbals together again and again. Look also noticed that people near him were moving their lips, taking deep breaths, and tapping their feet.

He guessed that the band was playing some exciting music and the spectators were singing and tapping their feet in time with it. Oh, Jeff would have loved to hear the blare of the horns, the high piping of the flutes, the clash of the cymbals, the rumble of the drums. Look wished he could sing along with the band. He sat down on the edge of one of the big horns. He tried hard to hear the sound, but of course he couldn't. He got very cross and even jumped up and down on the edge of the horn, but that didn't help.

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Finally he noticed that the shadows had gotten longer. An hour must certainly have passed. "It's time to go back to Jeff," Look thought. He headed back toward the apple tree under which Jeff was sleeping.

On the way he saw a boy walking along eating a pink ice cream cone. "I wonder if it is strawberry or cherry flavored," Look thought. He started toward it to find out, but he suddenly remembered — (pause for the children to finish the sentence) "Taste isn't here." He almost cried, because the cone looked so good. He never thought he would be so lonesome for Jeff and the other senses! And he was so glad when the big apple tree came into sight. There was Jeff, sleeping under it just where Look had left him!

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SECTION 3 SENSE OF HEARING

PURPOSE

- To increase the child's awareness of the diversity of sound.
- To establish the relation between sound and vibration.
- To find some ways to vary pitch.

COMMENTARY

Although the child is certainly aware of sounds in his environment, he is often unaware of the great diversity of these sounds. This section attempts to help the child realize the variety in the sounds he hears. Almost any object will make some kind of sound when it is tapped, shaken or crumpled, depending on the material of which it is made.

The child is given practice in identifying sound sources by listening to the sounds without seeing the objects that produce them. He discovers relations between the vibration of an object and the sound it is producing. He learns to make changes in pitch by filling water glasses to different levels and then tapping them, and also by changing the tension of a plucked string. He identifies sounds on records.

At various times you may want to have the children cover their ears with their hands, to emphasize that it is the ears that are involved in the sense of hearing.

Give your class experiences with a wide variety of sounds, harsh ones as well as pleasing ones. Do not limit yourself to those objects on the materials list.

MATERIALS

- bells (10)
- tambourines (10)
- finger cymbals or other cymbals (10)
- triangle (10)

- drum, tom-tom, or bongo drums (10)
- mallets (10)
- xylophone (10)
- sandpaper blocks (10)
- cans with marbles or stones inside (10)
- cloth to tear (10)
- paper to tear (10)
- cellophane to crumple (10)
- records of nature sounds (Consult record catalogues or libraries. There are many records of bird calls, insect sounds, frog and toad "choruses" and woodland and ocean sounds.) Record provided by MINNEMAST can be used here. (10)
- thick rubber bands (one for each child) (11)
- autoharp or some other stringed instrument (12)
- several matching glass tumblers (13)
- pitcher or jug for water (13)

Lesson 8: LISTENING FOR SOUNDS

Introduce this lesson by asking the children to close their eyes, listen for a few minutes, and describe what they hear. If it is possible to take the children outdoors or at least to open the windows, they will hear a greater variety of sounds than in the classroom. Listen for such sounds as traffic sounds, sounds of birds and insects, footsteps, wind and so on. Follow each child's response with such questions as the following:

WHAT MADE THE SOUND?

HOW DO YOU KNOW?

WHERE DID THE SOUND COME FROM?

WAS IT A LOUD OR A SOFT SOUND?

WAS IT A PLEASANT OR AN UNPLEASANT SOUND?

SOME SOUNDS WARN US OF POSSIBLE DANGER. DID YOU HEAR ANY SUCH SOUNDS?

I SHALL MAKE SOME SOUNDS WITH DIFFERENT THINGS. IF YOU RECOGNIZE THE SOUND, RAISE YOUR HAND. DO NOT ANSWER UNTIL I CALL ON YOU. (Shake a twig with leaves on it, knock a piece of wood on a tree, scrape the bark, hit two rocks together, imitate bird sounds, whistle on a blade of grass, etc.)

Lesson 9: GAME: MAKING SOUNDS

Have the children experiment with sound production. Give one child a pencil and have him tap an object in the room. A second child taps that object and another which gives a different sound. A third taps in order the objects tapped by the first and the second child and then his own selection. This game proceeds until the sequence is broken (usually after about six).

Lesson 10: GAME: WHAT MADE THE SOUND?

Display on a table or shelf all the sound-producing objects you have collected from the materials list except the rubber bands, the stringed instruments and the tumblers. After the children have used the objects freely, try the following activity:

A child turns his back to the table of objects and closes his eyes. Another child selects one object and makes a sound with it. The first child comes to the table and holds up the object he thinks the second child has used. If he is wrong, the second child shows him the correct object. If he is right, he is the next one to choose an object and make a sound with it.

OPTIONAL: Some teachers may make their own tape recordings of different sounds such as running water, slamming doors, bouncing balls and others which could be identified by the children.

Lesson 11: VIBRATIONS

Give each child a large rubber band. Ask the class if anyone knows how to make a sound with it. The children will soon discover ways of stretching and plucking the rubber bands.

Now cut the rubber bands. Have one child hold the two ends and stretch them apart while a second child plucks the band. They should be able to see the rubber band vibrate.

WHAT HAPPENS WHEN YOU PLUCK THE RUBBER BAND?

WE CALL THIS KIND OF MOVEMENT "VIBRATION."

WHAT ELSE DO YOU NOTICE WHEN YOU PLUCK THE RUBBER BAND? (It makes a sound.)

NOW STRETCH THE RUBBER BAND BUT DO NOT PLUCK IT. IS IT VIBRATING? (no) WHAT DO YOU HEAR? (nothing)

WHAT DO YOU THINK THE RUBBER BAND HAS TO DO IN ORDER TO MAKE A SOUND? (vibrate)

Follow this by having the children place their hands lightly on the front of their necks while they hum. They may be able to feel the vibrations from their voice boxes.

Lesson 12: CHANGING THE PITCH OF A PLUCKED STRING

Have the children take turns plucking single strings of an instrument such as an autoharp. Make sure that they see and feel the vibrations. Then have them listen carefully to the sound of one string. Loosen it and pluck it again.

IS THERE A CHANGE IN SOUND?

Tighten the string and pluck it again.

NOW WHAT HAPPENED TO THE SOUND?

This time keep plucking the string while loosening or tightening it, so that there is an audible fall or rise in pitch.

At this time, the word pitch may be introduced.

Lesson 13: VARIATION OF PITCH IN TUMBLERS

(You should try this ahead of time to determine approximately how much water must be added to glasses to change the pitch noticeably. If three glasses are used, the first can be filled one-fourth full, the second one-half full and the third three-fourths full.)

Arrange several tumblers in a row. Ask a child to tap each one with a pencil. Then add a small amount of water to one tumbler and have a child tap it. Keep adding water and tapping to demonstrate the change in pitch.

WHAT DO YOU NOTICE? (the pitch changes)

HOW IS IT DIFFERENT? (it gets lower as the water is increased)

WHAT DO YOU THINK WILL HAPPEN IF WE PUT WATER IN THE OTHER GLASSES? (the pitches will change)

SHALL WE PUT ABOUT THE SAME AMOUNT OF WATER IN EACH OR SHALL WE SEE WHAT WOULD HAPPEN IF WE PUT IN DIFFERENT AMOUNTS?

WHAT DO YOU THINK WILL HAPPEN? (with different amounts we will get different pitches)

HEAR'S ADVENTURE

"Bye-bye, off I go," said Hear. "I'll be hearing you in an hour."

As he floated away, he heard some loud laughter and excited shouting. He heard voices saying, "Let's play tag!" "You're it!" "I caught you!" "You can't catch me!"

Hear thought, "I'll bet those are some of Jeff's friends. I wonder if Mark and Nancy are there. If Look were with me, I would know; but there is so much noise that I can't hear the voices clearly enough to recognize them.

"I'd better be on my way now. An hour isn't very long, and I want to have many interesting things to tell the others." So off he went.

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Rat-a-ta-tat-tat, BOOM BOOM, rat-a-tat-tat BOOM! Hear began to vibrate with the sound. He knew it was a band playing. How he enjoyed the music! He danced along with it. Hear was so pleased that he bobbed up and down with the sound for a long time.

But then Hear remembered other times when he had been with Jeff and the other senses and had listened to a band playing. He remembered Look telling about how shiny the instruments were, and Touch saying how smooth and hard the metal was. Just the sound of the band alone wasn't quite the same.

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The sounds became softer and softer, and Hear knew that he had drifted away from the band. Suddenly he heard a voice quite close by saying, "Just smell the lovely flowers. See, they are every color of the rainbow." Hear knew that he must be near a garden, but of course he couldn't hear the flowers. He listened very hard, but it didn't help a bit.

He floated around, wondering what would happen next. Then he heard a sound that went "Crackle, munch, crunch...gulp." Was that someone eating popcorn? He listened again. He thought it was, but how could he be sure? So many things would sound just the same if they were being eaten.

Hear began to feel uncomfortable, not being sure of what was going on around him. He decided to return to Jeff, even if the hour weren't up yet. But how would he find him? "Oh yes, I'll listen for the children's voices. I hope they are still playing near him."

He listened as hard as he could. He heard the rap-tap-tap of a hammer and the clunk of a board dropping, but Hear was sure that there was no house being built in the park where Jeff was.

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He floated the other way. There he heard a splashing and gurgling, and before he knew it, he had splashed right into some water! It was the creek! He had to work very hard to get out of it. He was a little bit frightened. He began to think that this adventure wasn't so much fun after all.

He turned and turned, trying to find which way Jeff was. Then at last from far away he heard the children's voices. They were still playing tag! He went closer, and he knew that Jeff was near by. He listened very carefully, and finally he heard Jeff's gentle snore. Hear was so glad to be back with Jeff at last!

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SECTION 4 SENSE OF SMELL

PURPOSE

- To increase the child's awareness of his sense of smell.
- To develop the concept that an odor is carried by something from the object through the air to the nose.

COMMENTARY

The sense of smell is isolated to show its use in identifying and describing objects. It is difficult to describe odors, as the vocabulary is limited. Probably the best way to describe an odor is by analogy -- for example, "It smells like a flower."

There are many odors in the child's environment of which he may not be aware. Help him discover them. Take the children on a walk outdoors with the purpose of discovering as many odors as possible. These will vary with your area, with the season of the year and the weather. Some suggestions are fresh-cut grass or hay, crushed pine needles, moist soil, flowers, tar, automobile exhaust, gasoline, industrial odors, barnyard smells. Do not limit your explorations to the outdoor trip or to these lessons. Call attention to unusual odors whenever they are noticeable. Choose from the following list of materials those odor sources easiest to obtain for the lessons.

MATERIALS

- 1 each of six of the following: onion, orange, apple, ripe banana, fresh pine needles, chocolate, fragrant flower, cotton wad moistened with perfume, one moistened with liquid bleach or ammonia, moth flakes or balls, damp soil, sage or other herbs, sachet, cloves or other spices (14, 15)
- 6 plastic lattice berry boxes (15)
- 6 rubber bands (15)
- 1 yard cheese cloth, cut into 6 pieces, each large enough to wrap around a berry box (15)
- pictures of fruits and vegetables (15)
- plastic wrap (16)

Lesson 14: EXPLORING SMELLS

Pass around to the entire group an object whose odor is very potent, such as a very ripe banana. Be sure the children understand the meaning of "odor."

HOW DID YOU FIND OUT ABOUT THE ODOR?

WHAT SENSE ORGAN TELLS YOU ABOUT ODOR? (nose)

Pass another object for the children to smell. Initiate a discussion of different kinds of odors. Children may enjoy looking for descriptive words. (spicy, flowery, burnt, sharp, rotten, etc.)

Lesson 15: MYSTERY BOXES

Choose six items from the odor sources listed under Materials. Tape one item securely to the bottom of each berry box so that it doesn't rattle. There should be six mystery boxes, each one containing a different item. All surfaces of each box should be covered with enough cheesecloth to prevent seeing in, and the edges should be fastened tightly with a rubber band. This arrangement of the materials allows isolation of the sense of smell by eliminating sight, touch, sound and taste. Make an identifying mark on each box for your own information.

You will probably find that this activity works best with groups of not more than ten children. The rest of the children can be busy with other activities.

Prepare a drawing or picture of each of the mystery objects. Arrange the pictures on a rack (such as the chalk tray, or the music rack of the piano) and the boxes on a table or bench directly below. Have a child choose a box and ask him to find out what is in it. He may try other senses before smelling it, but must not open the box. Then ask:

CAN YOU TELL WHAT IS IN THE BOX BY SMELLING IT?

After the child has smelled it, he should put the box under the picture of the object he thinks it contains. Have the children take turns sniffing the boxes and indicating their decisions. If a child asks, tell him whether or not his selection is correct. If all the children cannot complete this activity in one day, refrigerate the boxes.

Lesson 16: CLOSING IN AN ODOR

Let the children sniff one of the most potent-smelling boxes. Then cover it entirely with plastic wrap in the presence of the children. Let each child sniff the wrapped box.

WHAT DO YOU SMELL NOW? (answers will vary)

WHY DON'T YOU AGREE? WHAT ABOUT THE BOX IS DIFFERENT FROM BEFORE? (it is wrapped in plastic)

Unwrap the box and again have the children smell it.

WHAT DID THE PLASTIC DO? (it kept the odor from us)

IS THERE ANY OTHER WAY WE CAN KEEP FROM SMELLING WHAT IS IN THE BOX? (some children will be sure to hold their noses)

Lesson 17: WHAT CAN YOUR NOSE TELL YOU?

This discussion may be held any time after the previous activities. It is based on the fact that many odors linger in the air for a long time.

SOMETIMES WE CAN TELL WHAT HAS HAPPENED AT HOME JUST BY THE SMELL. CAN YOU GIVE SOME EXAMPLES? (mother baked cookies or waxed the floor, somebody smoked, something burned, etc.)

PRETEND YOU ARE IN A STRANGE PLACE WITH YOUR EYES CLOSED.

YOU SMELL GASOLINE. WHERE MIGHT YOU BE?

YOU SMELL BREAD BAKING. WHERE MIGHT YOU BE?

YOU SMELL FLOWERS. WHERE MIGHT YOU BE?

YOU SMELL POPCORN. WHERE MIGHT YOU BE?

Continue with other such items if you desire.

SMELL'S ADVENTURE

Smell sniffed a few times. "Ah!" he exclaimed in delight, "I'm free and ready to go." He wiggled through the air, sniffing this way and that. He couldn't decide which way to go. Suddenly he stopped and sniffed again. "Um-m-m delicious. Such a lovely smell. What is better than the smell of a hamburger?" He floated along, following the smell of the hamburger until he plopped down in the middle of a bun. There were other odors too - pickle, mustard and catsup.

He jumped away suddenly, for he smelled a boy. "Oh, my, I'll bet that boy is eating the hamburger. I could have been swallowed! If Look were here, he would have seen the boy's mouth coming. Say, if I had been swallowed by him, that boy would have had two senses of smell and Jeff would have had none. Poor Jeff."

Off Smell went to see what else he could find. He followed a favorite smell of his and landed in the middle of a bag of popcorn. He wiggled around, enjoying himself very much.

"If Taste were here, he would be tasting some of that popcorn. Hear says that people make a lot of noise eating popcorn. I guess that is because they like it so much. If Hear were with me, I would know whether anyone were eating the popcorn."

He decided he had better get out of the bag and see what other adventures he could have.

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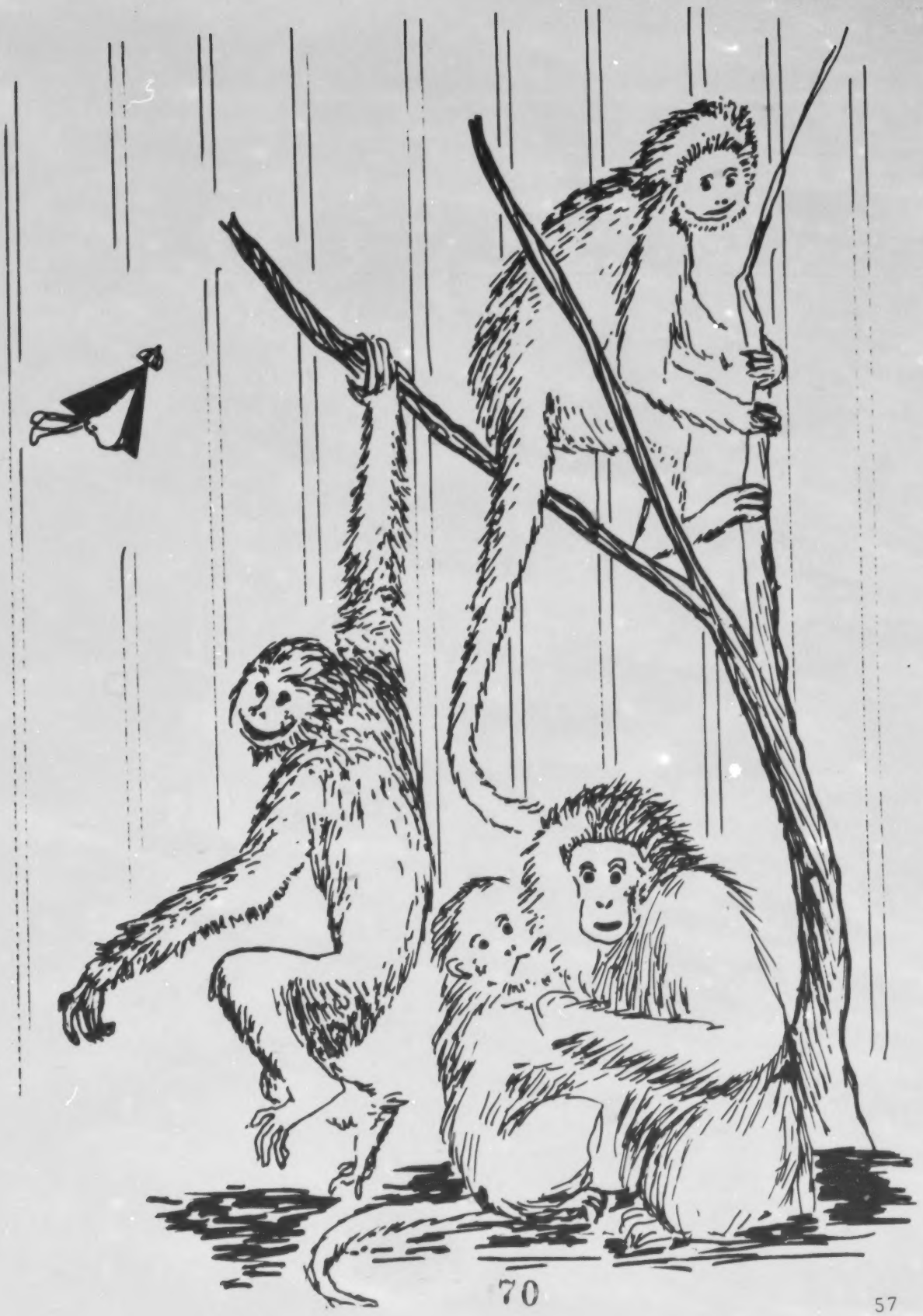
He noticed an oud smell. It was very strong. What could it be? He floated slowly and carefully, following the new smell as it got stronger and stronger.

"The zoo. That's where I am. I wonder what part I'm in?"

Smell inhaled again. "Whew, rather strong and not very pleasant." Sniffing carefully, he thought, "It's not a lion smell, nor a seal smell, and not a bear smell either...Oh, I know! It's a monkey smell. Jeff would like to be here. He likes monkeys. He likes to watch them do tricks and make funny faces."

Thinking about Jeff reminded Smell that it was time to go back to Jeff and the other senses. But he had a problem. "I wonder how I'll find Jeff. I can't smell anything but the monkey smell. I can't find my way out of the monkey cage. Help!"



Soon a more powerful smell came curling around and guided him right through the bars and out of the monkey cage. What was this new odor? He was puzzled at first and then he remembered that lions smelled like that. He did not like the unpleasant, musty smell of lions. It was very strong and it seemed to be all around him. Smell had to search hard to find the direction from which the odor came. He certainly didn't want to get into the lion's cage!

"Pff — that was a dangerous place for me to be. If only Look or Touch or Hear had been with me, I would not have gotten so close to the lions."

All at once Smell was pulled through the air. He recognized the smell of the hippopotamus, but what was happening to him? He could not seem to move. As he wiggled and twisted, the hippopotamus gave a big sneeze, "Ker-choo!" and Smell was free again.

What do you think had happened to Smell? That's right. Smell had gotten too close and had been sniffed inside of the hippo's nose. He had wiggled around so much that he tickled the hippo's nose and made him sneeze! Smell was glad that he got out.

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All at once he caught a whiff of a different smell. It was very sweet. He tried to follow it, but it was very faint. He turned around and tried the other direction. Now the smell grew stronger and stronger and sweeter and sweeter. Suddenly Smell knew what this odor was. It was an apple tree! Smell remembered that he had smelled this same smell when Jeff lay down to sleep. He knew that he must be near Jeff at last. He carefully floated down until he could smell the ground. He sniffed this way and that like a dog until he caught the smell of Jeff. He followed it, and soon found him.

Smell settled down and sighed. He was very pleased to be back. He had had some exciting adventures that he could tell the other senses, but he was glad that the adventures were over and he was back safely with Jeff again.

SECTION 5 SENSE OF TASTE

PURPOSE

- To increase the child's awareness of his sense of taste.
- To demonstrate the basic tastes: sweet, salty, sour, and bitter.

COMMENTARY

A very young child relies heavily on the sense of taste in exploring his surroundings. He usually tries to taste whatever he sees and touches. But by the time he comes to kindergarten, he uses more appropriate means of exploration. He has learned that tasting is generally confined to the realm of foods.

It is necessary to be a little cautious in this section. While we would like to convey the idea that the sense of taste is a means of gathering information about an object, we do not want to encourage children to taste indiscriminately. Before beginning any of the taste activities, say something similar to the following:

> WE HAVE EXPLORED WITH THREE OF OUR SENSES: SIGHT, HEARING, AND SMELL. NOW WE ARE GOING TO EXPLORE WITH OUR SENSE OF TASTE. YOU ALL KNOW THAT IT IS DANGEROUS TO PUT SOME THINGS INTO YOUR MOUTHS. THAT IS ONE REASON WHY WE CANNOT EXPLORE AS MANY THINGS BY TASTE AS WE CAN BY THE OTHER SENSES. EVERYTHING I WILL GIVE YOU TO TASTE IN THIS LESSON IS SAFE FOR YOU TO PUT IN YOUR MOUTHS. WHEN YOU WANT TO EXPLORE THE TASTE OF SOME OBJECT, YOU MUST BE SURE THAT IT IS SAFE TO PUT INTO YOUR MOUTHS. IT IS IMPORTANT TO ASK ME OR ONE OF YOUR PARENTS BEFORE YOU DO SOME TASTE EXPLORING ON YOUR OWN.

In the course of the activities in this section, the children may notice that there are differences between individuals. In addition to having differences in personal preferences, individuals may differ in their actual taste perceptions.

MATERIALS

- individual servings of food which have the four basic tastes: e.g., honey, sugar cubes, salt, lemon, grapefruit rind, sour pickle, bitter chocolate, instant coffee or instant tea (18)
- unsweetened cocoa (19)
- sugar (19)
- individual serving of foods with some combination of two or more of the four basic tastes: e.g., fruits, vegetables, ginger snaps, celery and salt, peanut butter, chocolate bits, sweet pickle, hard candy (19, 21)
- toothpicks (21)

Lesson 18: EXPLORING TASTES

Give each child a paper plate with samples of foods that have the four basic tastes: sugar and salt; for something sour, a slice of lemon or sour pickle; for something bitter, a small piece of grapefruit rind, cooking chocolate or instant coffee powder.

Ask a child to taste one of the samples and to describe what he discovers. Have each of the children taste his own sample of the same food. If there is disagreement, have them taste again. They will all probably be familiar with sweet and salty flavors. They may have some difficulty distinguishing between the bitter and the sour flavors. At this point introduce the terminology for the four basic tastes: sweet, sour, salty and bitter.

Lesson 19: COMBINATIONS OF FLAVORS

Give each child a sample of unsweetened cocoa to taste. Then, in their presence, mix the cocoa with an equal amount of sugar, and let them taste the mixture.

HOW DID THE COCOA TASTE? (bitter)

HOW DOES SUGAR TASTE? (sweet)

HOW DOES THE MIXTURE TASTE? (both sweet and bitter)

Provide the children with samples of foods having some combination of the four basic tastes. Let the children describe the taste of each in the manner described in the first activity. The necessity for identifying a combination of basic tastes will probably become apparent; e.g. apples, sweet pickles, and lemon drops are both sweet and sour; peanut butter is sweet and salty; chocolate bits are sweet and bitter. Continue with other samples. Then ask:

WHAT DID THIS EXPERIMENT SHOW ABOUT FLAVORS? (some things have a combination of tastes)

Lesson 20: PANTOMIME

DID YOU ALL LIKE EVERYTHING YOU TASTED IN THESE LESSONS? (The children's responses should lead to the generalization that personal preferences vary.)

IF YOU ATE A PICKLE, CAN YOU SHOW HOW IT TASTED WITHOUT TALKING? (facial expression and gestures)

HOW WOULD YOU LOOK IF YOU WERE EATING A HAMBURGER?

Have one child suggest a food and another child pretend he is eating it. Let the class guess whether he likes it or not.

Lesson 21: GUESS WHAT?

Prepare pieces of food such as pickles, celery with salt on it, hard candies, ginger cookies, peanut butter, or any of the others used in lesson 18 or 19. (Put a toothpick in the pickles and celery.) Have a child close his eyes and open his mouth. Put a piece of food in his mouth. After he has eaten it, he is to guess what it is and describe the taste. Because every child will want a turn, you may need to feed two or three children at a time.

WHAT SENSE ORGAN DO YOU USE WHEN YOU TASTE? (the mouth, especially the tongue)

IS THERE ANY OTHER SENSE ORGAN AT WORK? (permit speculation)

HOW CAN WE FIND OUT? (try closing eyes, holding nose, ears, etc. while tasting)

Have each child hold his nose and keep his eyes closed while you give him a food sample. Choose foods with a distinctive odor such as bananas or peanut butter.

CAN YOU TELL WHAT YOU ARE EATING AS EASILY NOW?

WHAT OTHER SENSE ORGAN DID YOU USE TO HELP YOU TELL WHAT YOU WERE EATING? (nose)

TASTE'S ADVENTURE

Taste felt so free! He wiggled his long tongue, smacked his lips and ran his tongue over them. He was all ready for some exciting adventures. He said to himself, "I'm going to taste everything! No one can stop me, not Look, nor Smell, nor Touch, nor Hear."

He knew that the apple tree was near the zoo and that there were all kinds of good foods on sale at the zoo. He was sure to find many interesting things to taste. So away he went.

Sure enough — that must be a hamburger that he bumped into! Taste wrapped himself around it and absorbed the flavor. "Yum, yum." He loved hamburger. But there seemed to be something missing from this one. It was nice and salty, and had just the right touch of the bitter flavor of mustard. (Some liked catsup with their hamburger, but not Taste. He liked mustard.) He could taste the sweetness of good meat, too. But what was it that was missing?

Well, whatever it was that <u>wasn't</u> there in the hamburger today, there were plenty of other things to taste. He ran into something sour next. It was such a nice sour taste — sour, and salty too. It was certainly a pickle, and Taste loved pickles.

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He went on chewing and swallowing and tasting. Soon he found another surprise. He had munched himself into a salty, buttery flavor that could only be found in a bag of popcorn. He remembered how much fun Jeff had throwing pieces of popcorn into the air and catching them in his mouth. But without Look or Touch, Taste couldn't do that. Even if he had been able to toss the popcorn, he wouldn't have been able to see to catch it. The popcorn was good to taste anyway, but Taste did wonder whether it was the white kind or the yellow kind.

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He hopped out of the bag and landed on something sweet. "M-m-m," he said to himself. "Chocolate. Could it be a chocolate ice cream cone? Or is it cake frosting? Or chocolate pudding? Or maybe a candy bar? I don't find a cake taste, so it probably isn't frosting. Most candy bars have nuts, and I don't taste any nuts. Just a minute now. I have a new flavor." He tasted carefully and thought, "This tastes like a cone. Yes, I think this must be a chocolate ice cream cone. If Touch were here, he would be able to tell me if the chocolate is cold. Then I'd know for sure." He took one more lick from the ice cream and another nibble from the cone. It certainly tasted good.

He moved on again.

"I tasted the hamburger, chewed on some popcorn and tasted the ice cream cone, but I still want more to taste. I wonder where I am now."

He seemed to be up against something that would not let him through. He wiggled up. It was still there. He wiggled down and came to a hole. Then he tasted water, so he wondered if he were at a drinking fountain. Maybe that hole was the drain. "I'm glad I didn't go down the drain," he thought. "How I miss the other senses."

He floated around for several minutes without tasting anything. He stuck out his tongue and waved it around like an antenna. He wondered if he was out in space. That would explain why he couldn't taste anything. What should he do now? If he were in outer space, he could float around forever and ever, and maybe never find his way back to Jeff. How would Jeff ever enjoy eating again if Taste were lost? Jeff liked to eat. Taste must get back to him.

Still using his tongue as a guide, he wiggled up and down and round and round. Then he landed, bump, on something. It tasted like a bun. He stuck his tongue into it and took a big bite.

"Ugh! Good grief!" he cried. "This is a hot dog but it's covered with that awful peppery bitter kind of mustard. Oh, my tongue is burning up. I want Jeff. Jeff would never have let me taste that! Where are you?" And Taste slid out of that bun in a hurry.

Taste knew that he was still in the park where Jeff was sleeping. He caught a ride in a paper cup of coke that someone was carrying. It was slightly sweet, somewhat sour, and, Taste was forced to admit, very flat. He wasn't at all sorry when some slopped over the edge of the cup and he fell to the ground with it. He preferred the taste of grass!

Then along came a rabbit munching a bit of sweet carrot. Taste hopped onto the carrot and was carried along for a while. The next flavor he met was both sweet and sour mixed together -- an apple! And guess whose hand was lying on the grass right next to the apple. Right! It was Jeff's.

SECTION 6 SENSE OF TOUCH

PURPOSE

- To increase the child's awareness that he can identify texture and shape by using his sense of touch.

- To focus attention on the fact that there must be direct contact if the sense of touch is to operate.

COMMENTARY

The sensations dealt with in the lessons on sight, hearing, and smell can be obtained from a distance, but tactile sensations can be obtained only when one touches an object. Tactile sensations involve pressure receptors. This is only one type of touch sensation; in this section we will not be concerned with heat, cold and pain, which are detected by other receptors.

MATERIALS

- a few objects with distinctive texture and shape, such as pineapple, coconut, cucumber, a piece of velvet, a smooth plastic object (22)

- cardboard with die-cut geometric shapes (23)

- 35 kits — each includes opaque plastic bag, cotton puff, large button, 16-penny spike, sandpaper, stone (25)

Lesson 22: TEXTURE

Show the children a pineapple, a coconut or any other object having a definite texture and shape, such as a cucumber, a brick, a piece of velvet, a smooth plastic object, etc. Ask a child to handle it.

WHAT CAN YOU TELL US ABOUT THE OBJECT?

WHICH SENSES HELPED YOU?

Have several children handle the object and see if they can discover different things about it. Narrow down the discussion by asking:

WHAT DOES YOUR SENSE OF TOUCH TELL YOU?

WHAT CAN YOUR SENSE OF TOUCH TELL YOU ABOUT ANY OBJECT THAT YOU CAN TOUCH? (hardness or softness, smoothness or roughness, shape)

Follow this same procedure with a few other objects.

Lesson 23: GAME: MATCH ME

Several sets of cardboards with die-cut geometric shapes are furnished. After you have removed the shapes from each cardboard, paste the cardboard onto another piece of paper for a backing.

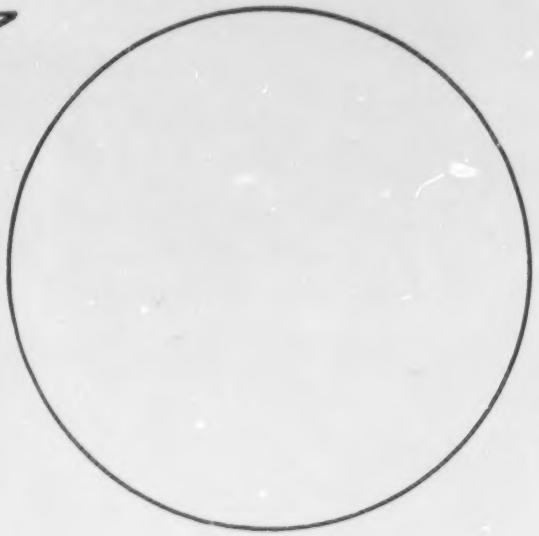
As many children can play as you have cardboards. Give each child a cardboard, and have them work in pairs. For each two children, mix, in a single pile, two of each of the geometric shapes.

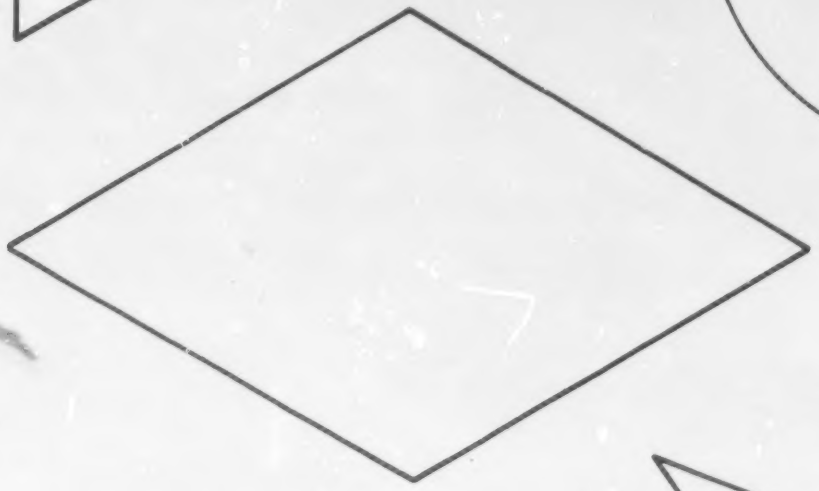
Blindfold the children or have them keep their eyes closed.

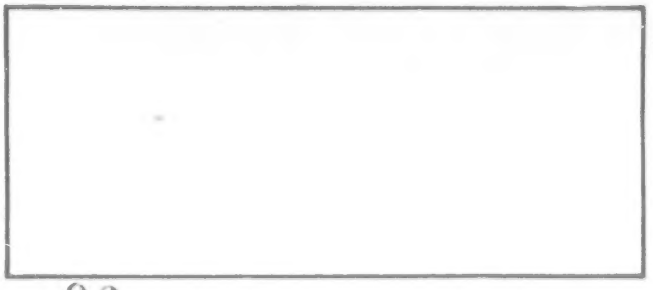
> RUN YOUR FINGER AROUND ONE OF THE HOLES IN THE CARDBOARD. NOW FIND A PIECE IN THE PILE THAT IS THE SAME SHAPE AS THE HOLE YOU FELT. FIT THE PIECE INTO THE HOLE. NOW FEEL ANOTHER HOLE AND FIND THE PIECE THAT FITS IT. CONTINUE UNTIL YOU HAVE FITTED A PIECE INTO EACH HOLE.

This game should be left out for the children to use in their free time activities.

copy of die-cut geometric shapes







Lesson 24: HOW NEAR, HOW FAR?

Ask the children whether it is necessary to have direct contact with an object in the operation of all of the five senses.

Set an object on a table far from the children.

WHAT IS ON THE TABLE?

HOW DO YOU KNOW?

CAN YOU TASTE IT WHILE YOU ARE SITTING HERE?

CAN YOU TOUCH IT FROM HERE?

DO YOU HAVE TO TOUCH SOMETING WITH YOUR NOSE TO SMELL IT?

Continue as long as you feel it is necessary for the children to come to understand that the sense of touch involves physical contact with the object.

Lesson 25: GAME: I TOUCH

This game involves a leader touching an object hidden in a bag and describing it, while the other players try to find a similar object in their own bags without peeking.

To indicate how an object is to be described in the game, hold up some object not in the bag collection (e.g., a pencil). Closing your eyes, say:

> I TOUCH, I TOUCH, OH, WHAT DO I TOUCH? IT IS LONG AND NARROW. IT HAS A HARD POINT ON ONE END. THE OTHER END IS ROUND AND SOFT. WHAT AM I TOUCHING?

Then let a child demonstrate how to reach in a bag, grasp one of the objects without looking, feel it carefully and then describe it. Have the rest of the children guess what object is being described.

Give each child a bag. Tell them that they are not to look inside, and that all the bags contain the same selection of objects. Choose a child to reach into his bag, feel an object and describe it, using the "I touch" verse. The other children should reach into their bags and, by feeling, select the object being described, but they are not to take it out until you give a signal. When all the children think they have found the correct object, tell them all to hold them up. Compare their selections with the object held up by the leader.

Repeat, selecting a new leader to describe an object in his bag. If a child uses a descriptive word referring to another sense, ask:

> WHAT SENSE TOLD YOU THAT?

TOUCH'S ADVENTURE

Touch had a hard time making up his mind about leaving Jeff. He could feel many things right here under the apple tree. In fact, right now he could feel the bark on the tree. There must be an apple on the ground right next to Jeff's hand. Touch could feel that it was round and smooth, and he could feel the stem too.

Touch began to giggle. Something was tickling him. It felt like a worm or caterpillar crawling. He decided it wasn't a bug because he seemed to feel many legs moving. He started to ask Look to tell him what it was, but of course Look wasn't there. Touch gave a shake, and whatever was crawling on him fell off.

Touch felt a gentle breeze come along. He decided to let it pick him up and carry him into the air. "Hey, I don't want to go up this high," he thought, but the breeze took him along anyway before it let him drift down again.

"Oh, what did I bump into? " He hung onto it and tried to find out what it was. It was very soft and smooth. As Touch moved around slowly, he came to something long and curved. It seemed to stand up away from the place where he had landed. The whole thing kept moving around. Suddenly it gave a shake, and Touch almost fell to the ground. He grabbed hold of something else that was very thin and stiff and long. He crawled along it until he came to a place that was big enough for him to sit on.

"I must be on an animal. That long curved part felt like a rabbit's ear. I think it was. I must have tickled him when I was feeling his ear. That's why he gave that shake. I guess I landed on a whisker and now I must be sitting on his nose. Good-bye, rabbit."

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Of course Touch could not tell if the rabbit answered him.

Touch stayed close to the ground. He felt a smooth round stone and then some long thin blades of grass. Then he came to something that was wet and gooey. "Mud!" he cried. "I like to play in mud." Suddenly he was picked up, squeezed and patted. The mud was all around him. He couldn't seem to move very much. He wiggled and twisted very hard to try to get away. (If Hear had been there, he would have heard a voice laughing and saying "Look at my mud pie. It's dancing!")

Touch finally wiggled out. "I'm not sure that I like mud as well as I did. I feel as though some of it is still on me. I hope I can find some water to wash it off." He knew that he had better stay on the ground if he wanted to find a place to bathe.

As he moved along, he came to a big lump. He climbed up one side. It was rough. And then — "Ouch, I got a sliver in me! It hurts." Touch cried just a little as he pulled it out. He floated off quickly. He wondered what it was that he had climbed.

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Again the gentle breeze picked him up and carried him along. He felt the coolness of the air, and he felt some tiny drops of moisture too. Touch swayed back and forth feeling very happy.

The breeze set Touch down gently on something that was hard and smooth. It was slippery too. Touch slid down it only to be blown back up. He slid down again, and again was blown back. This was fun, but Touch wished he knew where he was and what he was sliding on. After he had slid down several times, an especially hard puff blew him beyond the slide and he fell to the ground.

"I've had enough adventures," Touch thought. "I want to go back to Jeff. I wonder which way I should go.

"Little breeze, you took me away from Jeff. Now please take me back."

So the little breeze picked up Touch and blew him back to Jeff. Touch moved all over Jeff, feeling his hair, his skin, his face and even his toes. The boy felt just right to him and Touch knew he was back with Jeff where he belonged.

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SECTION 7 FUN WITH OUR SENSES

PURPOSE

- To review the five senses, their functions and their associated organs.

- To show the interdependence of the senses.

COMMENTARY

By this time the child should be well aware of the role the senses play in his everyday life. There will be many times during the rest of the year when the concepts developed in this unit can be reinforced since the child is, of course, always using his senses. Encourage spontaneous references to sense impressions.

MATERIALS

- rubber ball and plastic ball of similar size (27)
- fresh fruit and plastic fruit of same kind (27)
- sugar cube and cubical box or block of similar size (27)
- carrot and parsnip of similar size (27)
- beet and turnip of similar size (27)
- hard boiled egg (28)
- 4 sets of sense and object blocks (29)
- unpopped corn (31)
- corn popper (31)
- oil or shortening (31)
- salt (31)
- paper cups (31)

Lesson 26: RIDDLES: WHICH SENSE IS IT?

Begin by telling the children that you are going to recite some riddles for them.

SOMETIMES WE USE FIVE SENSES,
SOMETIMES ONLY ONE.
GUESS WHICH SENSE WE'RE USING NOW.
WE'LL HAVE LOTS OF FUN!

I LOOK UP HIGH AT THE STARRY SKY
WHEN IT'S LATE AT NIGHT.
I KNOW WHAT SENSE I'M USING,
IT'S THE SENSE OF (sight)

I LIKE TO BE IN THE KITCHEN
AND PLAY MY GUESSING GAME.
WHAT'S BAKING IN THE OVEN?
I BET I KNOW ITS NAME!
I CAN ALWAYS TELL
BECAUSE I USE MY SENSE OF (smell)

THE STORM IS PASSING THROUGH THE SKY,
RAIN AND THUNDER ARE NEARING.
I'LL KNOW WHEN THEY COME TO US
BECAUSE OF MY SENSE OF (hearing)

I'M IN A PLACE WHERE I CANNOT SEE
OR HEAR OR TASTE OR SMELL.
OH WHERE AM I, OH WHERE AM I?
I REALLY COULD NOT TELL
WITHOUT A MOST IMPORTANT SENSE,
THE SENSE THAT TELLS SO MUCH,
THE SENSE THAT SEES IN THE DARK FOR ME,
YOU KNOW — MY SENSE OF (touch)

JOHNNY'S MOTHER PROMISED HIM
SUCH GOOD THINGS TO EAT —
HAMBURGER AND SALTY CHIPS,
PICKLES SOUR AND ICE CREAM SWEET.
IT WAS ALMOST 6 O'CLOCK
AND HOME OUR JOHNNY RACED.
HE COULD HARDLY STAND TO THINK
HOW GOOD THAT FOOD WOULD (taste)

Lesson 27: HOW MANY SENSES DO YOU NEED?

These activities are designed to help the child discover how often he uses several senses in combination when identifying objects.

Prepare several matched pairs of objects, such as rubber ball and plastic ball, fresh fruit and plastic fruit, sugar cube and cubical block, carrot and parsnip, beet and turnip. These pairs should be of similar size.

Select a child to decide "which is which" while the rest of the class looks on. Show this child and the class a pair of objects, for example the carrot and the parsnip. Name each one. Allow him to look at the vegetables but not touch them. Then ask him to close his eyes. Give him both vegetables and ask him to identify them using just one sense at a time.

CAN YOU TELL WHICH IS WHICH BY YOUR SENSE OF TOUCH? (very likely he will be unable to do so)

CAN YOU TELL WHICH IS WHICH BY YOUR SENSE OF HEARING? YOU CAN TAP EACH ONE WITH A PENCIL. (he will be unable to tell)

CAN YOU TELL WHICH IS WHICH BY YOUR SENSE OF SMELL? (he may be able to identify the odor of the carrot; if not continue)

CAN YOU TELL WHICH IS WHICH BY YOUR SENSE OF TASTE? Give him a small piece of each to taste. (if he cannot tell one from the other, continue)

CAN YOU TELL WHICH IS WHICH BY YOUR SENSE OF SIGHT?

Procede in a similar way with the other paired objects, using other children. Probably the rubber ball can be distinguished from the plastic one by one sense alone (touch). The fresh fruit is distinguishable from the plastic one by either sound or odor. You should expect that it may sometimes take only one sense to tell the child what he needs to know. Of course in this case you go right on to another pair of objects.

Lesson 28: AN UNKNOWN OBJECT

Conceal a hard-boiled egg in a paper bag. Tap the egg (which is still in the bag) so all can hear the sound.

CAN ANYONE TELL ME WHAT I AM TAPPING?

Next, holding the bag partly open, allow each child to smell the object in the bag after he has closed his eyes.

NOW CAN YOU TELL WHAT IS IN THE BAG?

Then let each child in turn feel the egg. Caution them not to tell what they think it is until all the children have felt it.

Finally hold up the egg so the children can see it.

HOW MANY SENSES HELPED YOU DISCOVER THAT IT WAS AN EGG?

Lesson 29: GAME: OBJECTS AND SENSES

This game helps the children to associate a particular sense with the appropriate sense organ. It involves a pair of six-sided blocks — one with pictures of the sense organs, the other with six common objects. The children are to roll each block and see what pictures come up. Then they say what that sense organ would perceive about that object. Many children will notice things they had never thought much about before, such as the sound made by breaking up a leaf of lettuce or the feel of an ice cream cone.

Demonstrate the game by tossing a sense block and an object block. If, for example, the ear comes up on the sense block together with a dog on the object block, tell the children that the ear can hear the dog bark. Ask the children for other sounds the dog can make.

The side of the block with the child on it is a bonus throw. When this comes up, the pupil gets a chance to tell what all five senses could perceive about whatever has come up on the object block.

As soon as the children understand the procedure, they can play the game themselves. After a child throws one sense and one object block, he should say what that sense would tell about the object. Then the rest of the class may make additional suggestions.

Variation: Four children can play at once. One throws the sense organ block. The others take turns throwing the object block and telling ways in which the objects that come up relate to the sense organ block the first child threw.

The children may like to play this at other times, so you may wish to make extra sets of blocks picturing the same or other objects.

Lesson 30: RIDDLES: MANY SENSES

The teacher begins the game by saying the following riddles, or similar ones. The pictures on the following pages should be used after the children have had time to think about the answer. After a few examples, the children can make up their own.

Smell, smell,
What do I smell?
The animal's black;
Its stripe is white.
So I run with all my might.
What is it? (a skunk)

Smell, touch,
What do I see?
It's tall and green and prickly.
We bring it home at Christmas time
And trim it brightly for all to see.
What is it? (an evergreen)

Smell, touch,
What do I see?
It's red or yellow or pink or white.
It pricks my fingers
But it's soft on my nose.
It smells so sweet in the garden
It smells so sweet in a vase.
What is it? (a rose)

What can I hear,
What can I see,
But cannot touch
Because it flies from me?
What is it? (a bird, a fly, etc.)

I hear it sizzle;
It smells so good!
I can't wait to taste
My favorite food.
Daddy hooked it,
Mommy cooked it.
What is it? (a fish)

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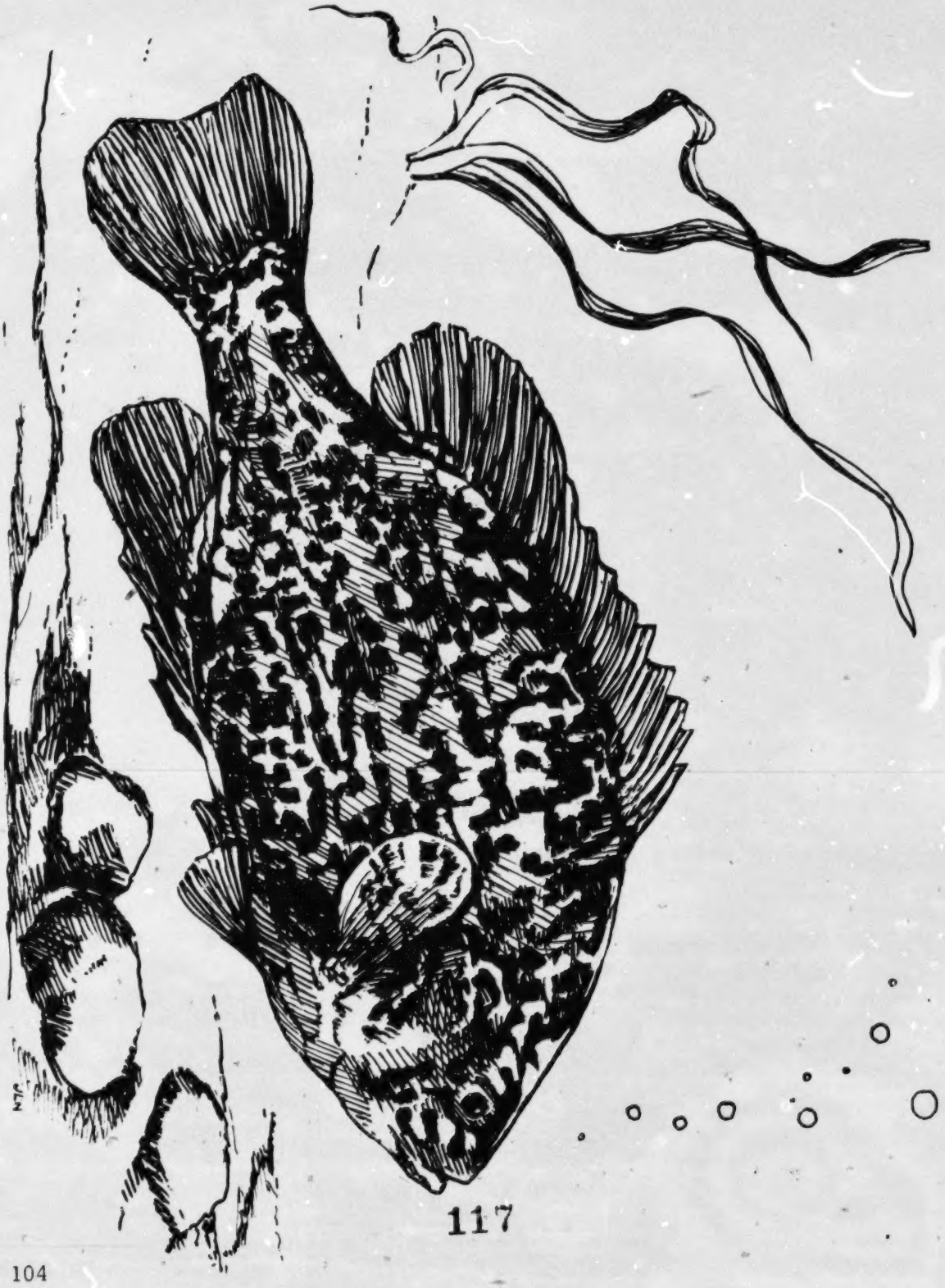

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Lesson 31: POPCORN PARTY

This activity wraps up all the senses treated in this unit in one enjoyable package. Popcorn is a source of stimuli for all five senses. It has a distinctive look, feel, sound, smell and taste and, best of all, the children like it. You can use an electric corn popper, an electric skillet, or any other appropriate appliance. Paper cups are handy for serving.

Keep some of the unpopped grains for the children to feel and to compare later with the popped ones as to smell, taste and appearance. Pop the remainder of the corn. The children will have no difficulty in recognizing the different sensory stimuli. Use the popped corn for a snack. Ask the children appropriate questions while you are distributing it.

POSTSCRIPT

Later in the year, you will find many opportunities to extend and reinforce the children's awareness of the operation of their senses. On field trips be sure to call their attention to outdoor sounds and smells. Have them feel the textures of leaves, grass, stones, bark, pavement, sand, etc. See the Handbook for further suggestions on arranging field trips.

WAKE UP

"Wake up, Jeff" his mother said. "I didn't expect to find you asleep under the apple tree."

Jeff sat up and rubbed his eyes. Then he jumped up excitedly.

"Mother, do you know what? I had a dream, and it was about my senses. Each one had a name — Look, Hear, Smell, Taste and Touch. They decided to separate and each go to different places. They were going to come back to me in an hour and tell about their adventures. And did they have adventures!

"Look saw a parade. He saw a band. But do you know, Mother, he couldn't hear what they were playing. He saw a boy with an ice cream cone, but he didn't know what flavor it was because he couldn't taste it.

"Hear was also with the band in the parade but he couldn't see it. He vibrated with the sound and he did a dance. He heard someone telling about some beautiful flowers, but he couldn't see them or smell them. It was disappointing. Poor Hear fell into the creek. He was frightened. He needed Look to help him keep out of danger."

"This is a very interesting dream, Jeff," Mother said. "What happened to the other senses? Did they have exciting adventures too?"

"They sure did. Each one of them got into some trouble because the others weren't there. They had fun too. Smell and Taste each found a hamburger with mustard and pickles. Smell was on a hamburger and a boy almost swallowed him! He got away just in time! And Taste found a hot dog but it had an awful-tasting mustard on it — you know, that sharp kind I don't like. He took a big bite and it sure

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tasted awful. Taste landed on a drinking fountain and almost went down the drain. I could have lost him. Then what would I have done? "

"Why didn't Taste look where he was going? He should have seen the drain," Mother said.

"Aw, Mother, Look was off somewhere else, watching the parade. He wasn't with Taste," Jeff reminded her.

"Oh, that's right. Each sense was by itself and so, of course, they couldn't help each other. Did your senses have other adventures? "

"I'll say they had adventures. Both Smell and Taste visited a bag of popcorn but I don't think it was the same bag. Then Smell followed a strong odor and went to the zoo. He visited the monkey's cage. He had to wiggle very hard to keep out of the lion's cage. I'll bet you can't guess what happened to Smell when he got to the hippopotamus? The hippo sniffed Smell into his nose."

"Oh my, how did he get out? " Mother asked.

Jeff giggled. "He jumped around and tickled the hippo. The hippo sneezed and out Smell flew. He came back to me and was very glad to get here. For quite awhile Taste couldn't find anything to taste. He thought that he must be out in space. And Mom, he used his tongue for an antenna. Wasn't that clever? "

"It certainly was. He isn't still in space, is he?" Mother asked.

"No, his tongue helped him get back. That was when he got into the bitter mustard. He caught a ride in a cup of coke, and then a rabbit brought him back to me."

"What happened to Touch? You haven't told me about him."

"Touch had a hard time. He couldn't decide where to go. A little breeze picked him up and took him to many places. He rode on a rabbit. Guess what? He was made into a mud pie. He got a sliver in him and it hurt. He used a saxophone as a slide and had lots of fun. Of course, he didn't know it was a saxophone but I guessed that was what it was.

"You know, Mother, there was something I learned that is very important. One sense could not get along by himself. Look couldn't taste, touch, smell or hear anything and so he didn't have as much fun as if the others had been with him. It was even more true of the other senses. Each of them needed the others. Taste couldn't tell the color of the popcorn he was eating and Smell couldn't taste it. Wouldn't it be nice if all my senses could enjoy some popcorn together? Could we get a bag of popcorn, Mother, please?"

Mother laughed and nodded. So off they went, following their noses to the popcorn stand.